

CPC**COOPERATIVE PATENT CLASSIFICATION****H03D**

DEMODULATION OR TRANSFERENCE OF MODULATION FROM ONE CARRIER TO ANOTHER (masers, lasers [H01S](#); circuits capable of acting both as modulator and demodulator [H03C](#); details applicable to both modulators and frequency-changers [H03C](#); demodulating pulses [H03K 9/00](#); transforming types of pulse modulation [H03K 11/00](#); coding, decoding or code conversion, in general [H03M](#); repeater stations [H04B 7/14](#); demodulators adapted for ac systems of digital information transmission [H04L 27/00](#); synchronous demodulators adapted for colour television [H04N 9/66](#))

NOTE

This subclass covers only:

- demodulation or transference of signals modulated on a sinusoidal carrier or on electromagnetic waves;
- comparing phase or frequency of two mutually-independent oscillations.

H03D 1/00

Demodulation of amplitude-modulated oscillations ([H03D 5/00](#), [H03D 9/00](#), [H03D 11/00](#) take precedence)

H03D 1/02

. Details

H03D 1/04

.. Modifications of demodulators to reduce interference by undesired signals

H03D 1/06

.. Modifications of demodulators to reduce distortion, e.g. by negative feedback

H03D 1/08

. by means of non-linear two-pole elements ([H03D 1/22](#), [H03D 1/26](#), [H03D 1/28](#) take precedence)

H03D 1/10

.. of diodes

H03D 1/12

... with provision for equalising ac and dc loads

H03D 1/14

. by means of non-linear elements having more than two poles ([H03D 1/22](#), [H03D 1/26](#), [H03D 1/28](#) take precedence)

H03D 1/16

.. of discharge tubes

H03D 1/18

.. of semiconductor devices

H03D 1/20

.. with provision for preventing undesired type of demodulation, e.g. preventing anode detection in a grid detection circuit

H03D 1/22

. Homodyne or synchrodyne circuits {(receiver circuits [H04B 1/30](#))}

H03D 1/2209

.. {Decoders for simultaneous demodulation and decoding of signals composed of a sum-signal and a suppressed carrier, amplitude modulated by a difference signal, e.g. stereocoders}

H03D 1/2218

... {using diodes for the decoding}

H03D 1/2227

... {using switches for the decoding (diodes used as switches [H03D 1/2218](#))}

H03D 1/2236

... {using a phase locked loop}

- H03D 1/2245 .. {using two quadrature channels ([H03D 1/2209](#) takes precedence)}
- H03D 1/2254 ... {and a phase locked loop}
- H03D 1/2272 .. {using FET's ([H03D 1/2209](#), [H03D 1/2245](#) and [H03D 1/2281](#) take precedence)}
- H03D 1/2281 .. {using a phase locked loop ([H03D 1/2236](#) and [H03D 1/2254](#) take precedence)}
- H03D 1/229 .. {using at least a two emitter-coupled differential pair of transistors ([H03D 1/2209](#) to [H03D 1/2281](#) take precedence)}
- H03D 1/24 .. for demodulation of signals wherein one sideband or the carrier has been wholly or partially suppressed {(receiver circuits [H04B 1/302](#))}
- H03D 1/26 . by means of transit-time tubes
- H03D 1/28 . by deflecting an electron beam in a discharge tube ([H03D 1/26](#) takes precedence)

- H03D 3/00** **Demodulation of angle-, {frequency- or phase-} modulated oscillations ([H03D 5/00](#), [H03D 9/00](#), [H03D 11/00](#) take precedence)**

- H03D 3/001 . {Details of arrangements applicable to more than one type of frequency demodulator ([H03D 3/28](#) takes precedence)}
- H03D 3/002 .. {Modifications of demodulators to reduce interference by undesired signals ([H03D 3/248](#) takes precedence)}
- H03D 3/003 .. {Arrangements for reducing frequency deviation, e.g. by negative frequency feedback (combined with a phase locked loop demodulator [H03D 3/242](#); changing frequency deviation for modulators [H03C 3/06](#))}
- H03D 3/004 ... {wherein the demodulated signal is used for controlling an oscillator, e.g. the local oscillator}
- H03D 3/005 ... {wherein the demodulated signal is used for controlling a bandpass filter (automatic bandwidth control [H03G](#); automatic frequency control [H03J 7/02](#))}
- H03D 3/006 . {by sampling the oscillations and further processing the samples, e.g. by computing techniques ([H03D 3/007](#) takes precedence)}
- H03D 3/007 . {by converting the oscillations into two quadrature related signals ([H03D 3/245](#) takes precedence)}
- H03D 3/008 .. {Compensating DC offsets}
- H03D 3/009 .. {Compensating quadrature phase or amplitude imbalances}

- H03D 3/02 . by detecting phase difference between two signals obtained from input signal ([H03D 3/28](#) to [H03D 3/32](#) take precedence; {muting in frequency-modulation receivers [H03G 3/28](#); limiting arrangements [H03G 11/00](#))}
- H03D 3/04 .. by counting or integrating cycles of oscillations {arrangements for measuring frequencies [G01R 23/10](#)}
- H03D 3/06 .. by combining signals additively or in product demodulators
- H03D 3/08 ... by means of diodes, e.g. Foster-Seeley discriminator
- H03D 3/10 in which the diodes are simultaneously conducting during the same half period of the signal, e.g. radio detector
- H03D 3/12 ... by means of discharge tubes having more than two electrodes
- H03D 3/14 ... by means of semiconductor devices having more than two electrodes
- H03D 3/16 ... by means of electromechanical resonators

- H03D 3/18 . . . by means of synchronous gating arrangements
- H03D 3/20 producing pulses whose amplitude or duration depends on phase difference
- H03D 3/22 . . . by means of active elements with more than two electrodes to which two signals are applied derived from the signal to be demodulated and having a phase difference related to the frequency deviation, e.g. phase detector
- H03D 3/24 . . . Modifications of demodulators to reject or remove amplitude variations by means of locked-in oscillator circuits
 - H03D 3/241 {the oscillator being part of a phase locked loop}
 - H03D 3/242 {combined with means for controlling the frequency of a further oscillator, e.g. for negative frequency feedback or AFC}
 - H03D 3/244 {combined with means for obtaining automatic gain control}
 - H03D 3/245 {using at least twophase detectors in the loop ([H03D 3/244](#) takes precedence; in general [H03L 7/087](#))}
 - H03D 3/247 {using a controlled phase shifter (in general [H03L 7/081](#))}
 - H03D 3/248 {with means for eliminating interfering signals, e.g. by multiple phase locked loops (multiple loops in general [H03L 7/07](#), [H03L 7/22](#))}
- H03D 3/26 . . . by means of sloping amplitude/frequency characteristic of tuned or reactive circuit ([H03D 3/28](#) to [H03D 3/32](#) takes precedence)
- H03D 3/28 . . . Modifications of demodulators to reduce effects of temperature variations ({automatic frequency regulation in receivers [H03J](#)}; automatic frequency control [H03L](#))
- H03D 3/30 . . . by means of transit-time tubes
- H03D 3/32 . . . by deflecting an electron beam in a discharge tube ([H03D 3/30](#) takes precedence)
- H03D 3/34 . . . by means of electromechanical devices ([H03D 3/16](#) takes precedence)
- H03D 5/00** **Circuits for demodulating amplitude-modulated or angle-modulated oscillations at will** ([H03D 9/00](#), [H03D 11/00](#) take precedence)
- H03D 7/00** **Transference of modulation from one carrier to another, e.g. frequency-changing** ([H03D 9/00](#), [H03D 11/00](#) take precedence; dielectric amplifiers, magnetic amplifiers, parametric amplifiers used as a frequency-changers [H03F](#))
- H03D 7/005 . . . {by means of superconductive devices}
- H03D 7/02 . . . by means of diodes ([H03D 7/14](#) to [H03D 7/22](#) take precedence)
- H03D 7/04 having {a partially} negative resistance characteristic, e.g. tunnel diode
- H03D 7/06 . . . by means of discharge tubes having more than two electrodes ([H03D 7/14](#) to [H03D 7/22](#) take precedence)
- H03D 7/08 the signals to be mixed being applied between the same two electrodes
- H03D 7/10 the signals to be mixed being applied between different pairs of electrodes
- H03D 7/12 . . . by means of semiconductor devices having more than two electrodes ([H03D 7/14](#) to [H03D 7/22](#) take precedence)
- H03D 7/125 {with field effect transistors}

- H03D 7/14 . . . Balanced arrangements
 - H03D 7/1408 . . . {with diodes}
 - H03D 7/1416 . . . {with discharge tubes having more than two electrodes}
 - H03D 7/1425 . . . {with transistors}
- WARNING**
- Subgroups [H03D 7/1433](#) to [H03D 7/1491](#) are incomplete pending reclassification; see also this group and its other subgroups
- H03D 7/1433 . . . {using bipolar transistors ([H03D 7/145](#) takes precedence)}
 - H03D 7/1441 . . . {using field-effect transistors ([H03D 7/145](#) takes precedence)}
 - H03D 7/145 . . . {using a combination of bipolar transistors and field-effect transistors}
 - H03D 7/1458 . . . {Double balanced arrangements, i.e. where both input signals are differential}
 - H03D 7/1466 . . . {Passive mixer arrangements}
 - H03D 7/1475 . . . {Subharmonic mixer arrangements}
 - H03D 7/1483 . . . {comprising components for selecting a particular frequency component of the output}
 - H03D 7/1491 . . . {Arrangements to linearise a transconductance stage of a mixer arrangement}
- H03D 7/16 . . . Multiple-frequency-changing
 - H03D 7/161 . . . {all the frequency changers being connected in cascade}
 - H03D 7/163 . . . {the local oscillations of at least two of the frequency changers being derived from a single oscillator}
 - H03D 7/165 . . . {at least two frequency changers being located in different paths, e.g. in two paths with carriers in quadrature ([combined with amplitude demodulation H03D 1/2245](#), [combined with angle demodulation H03D 3/007](#); [N-path filters H03H 19/002](#))}
 - H03D 7/166 . . . {using two or more quadrature frequency translation stages}
 - H03D 7/168 {using a feedback loop containing mixers or demodulators}
- H03D 7/18 . . . Modifications of frequency-changers for eliminating image frequencies {([H03D 7/16](#) takes precedence)}
- H03D 7/20 . . . by means of transit-time tubes
 - H03D 7/22 . . . by deflecting an electron beam in a discharge tube ([H03D 7/20](#) takes precedence)
- H03D 9/00** **Demodulation or transference of modulation of modulated electromagnetic waves**
(demodulating light, transferring modulation in light waves [G02F 2/00](#))
- H03D 9/02 . . . Demodulation using distributed inductance and capacitance, e.g. in feeder lines
 - H03D 9/04 . . . for angle-modulated oscillations
- H03D 9/06 . . . Transference of modulation using distributed inductance and capacitance
 - H03D 9/0608 . . . {by means of diodes}
 - H03D 9/0616 . . . {mounted in a hollow waveguide ([H03D 9/0641](#) takes precedence)}
 - H03D 9/0625 . . . {mounted in a coaxial resonator structure}

- H03D 9/0633 . . . {mounted on a stripline circuit}
- H03D 9/0641 {located in a hollow waveguide}
- H03D 9/065 . . {by means of discharge tubes having more than two electrodes}
- H03D 9/0658 . . {by means of semiconductor devices having more than two electrodes}
- H03D 9/0666 . . . {using bipolar transistors ([H03D 9/0683](#) takes precedence)}
- H03D 9/0675 . . . {using field effect transistors ([H03D 9/0683](#) takes precedence)}
- H03D 9/0683 . . . {using a combination of bipolar transistors and field effect transistors}

H03D 11/00 Super-regenerative demodulator circuits {applications in responders [G01S](#)}

- H03D 11/02 . for amplitude-modulated oscillations
- H03D 11/04 . . by means of semiconductor devices having more than two electrodes
- H03D 11/06 . for angle-modulated oscillations
- H03D 11/08 . . by means of semiconductor devices having more than two electrodes

H03D 13/00 Circuits for comparing the phase or frequency of two mutually-independant oscillations {(measuring phase [G01R 25/00](#); phase-discriminators with yes/no output [G01R 25/005](#))}

- H03D 13/001 . {in which a pulse counter is used followed by a conversion into an analog signal}
- H03D 13/002 . . {the counter being an up-down counter}
- H03D 13/003 . {in which both oscillations are converted by logic means into pulses which are applied to filtering or integrating means}
- H03D 13/004 . . {the logic means delivering pulses at more than one terminal, e.g. up and down pulses}
- H03D 13/005 . {in which one of the oscillations is, or is converted into, a signal having a special waveform, e.g. triangular}
- H03D 13/006 . . {and by sampling this signal by narrow pulses obtained from the second oscillation}
- H03D 13/007 . {by analog multiplication of the oscillations or by performing a similar analog operation on the oscillations}
- H03D 13/008 . . {using transistors}
- H03D 13/009 . . {using diodes}

H03D 99/00 Subject matter not provided for in other groups of this subclass

H03D 2001/00 Demodulation of amplitude-modulated oscillations ([H03D 5/00](#), [H03D 9/00](#), [H03D 11/00](#) take precedence)

- H03D 2001/22 . Homodyne or synchrodyne circuits {(receiver circuits [H04B 1/30](#))}
- H03D 2001/2245 . . {using two quadrature channels ([H03D 1/2209](#) takes precedence)}

H03D 2001/2254 . . . {and a phase locked loop}
 H03D 2001/2263 including a counter or a divider in the PLL

H03D 2009/00 Demodulation or transference of modulation of modulated electromagnetic waves
 (demodulating light, transferring modulation in light waves [G02F 2/00](#))

H03D 2009/06 . Transference of modulation using distributed inductance and capacitance
 H03D 2009/0691 .. by means of superconductive devices

H03D 2200/00 Indexing scheme relating to details of demodulation or transference of modulation from one carrier to another covered by H03D

H03D 2200/0001 . Circuit elements of demodulators
 H03D 2200/0003 .. Rat race couplers
 H03D 2200/0005 .. Wilkinson power dividers or combiners
 H03D 2200/0007 .. Dual gate field effect transistors
 H03D 2200/0009 .. Emitter or source coupled transistor pairs or long tail pairs
 H03D 2200/0011 .. Diodes
 H03D 2200/0013 . . . Diodes connected in a ring configuration
 H03D 2200/0015 . . . Diodes connected in a star configuration
 H03D 2200/0017 .. Intermediate frequency filter
 H03D 2200/0019 .. Gilbert multipliers
 H03D 2200/0021 .. Frequency multipliers
 H03D 2200/0023 .. Balun circuits
 H03D 2200/0025 .. Gain control circuits
 H03D 2200/0027 . . . including arrangements for assuring the same gain in two paths
 H03D 2200/0029 .. Loop circuits with controlled phase shift
 H03D 2200/0031 .. PLL circuits with quadrature locking, e.g. a Costas loop
 H03D 2200/0033 .. Current mirrors
 H03D 2200/0035 .. Digital multipliers and adders used for detection
 H03D 2200/0037 .. Diplexers
 H03D 2200/0039 .. Exclusive OR logic circuits

H03D 2200/0041 . Functional aspects of demodulators
 H03D 2200/0043 .. Bias and operating point
 H03D 2200/0045 .. Calibration of demodulators
 H03D 2200/0047 .. Offset of DC voltage or frequency
 H03D 2200/0049 .. Analog multiplication for detection
 H03D 2200/005 . . . Analog to digital conversion
 H03D 2200/0052 .. Digital to analog conversion
 H03D 2200/0054 .. Digital filters

- H03D 2200/0056 . . . including a digital decimation filter
- H03D 2200/0058 . . . using a digital filter with interpolation
- H03D 2200/006 . . . Signal sampling
- H03D 2200/0062 . . . Computation of input samples, e.g. successive samples
- H03D 2200/0064 . . . Detection of passages through null of a signal
- H03D 2200/0066 . . . Mixing
- H03D 2200/0068 . . . by computation
- H03D 2200/007 . . . by using a logic circuit, e.g. flipflop, XOR
- H03D 2200/0072 . . . by complex multiplication
- H03D 2200/0074 . . . using a resistive mixer or a passive mixer
- H03D 2200/0076 . . . using a distributed mixer
- H03D 2200/0078 . . . using a switched phase shifter or delay line
- H03D 2200/008 . . . Hilbert type transformation
- H03D 2200/0082 . . . Quadrature arrangements
- H03D 2200/0084 . . . Lowering the supply voltage and saving power
- H03D 2200/0086 . . . Reduction or prevention of harmonic frequencies
- H03D 2200/0088 . . . Reduction of intermodulation, nonlinearities, adjacent channel interference; intercept points of harmonics or intermodulation products
- H03D 2200/009 . . . Reduction of local oscillator or RF leakage
- H03D 2200/0092 . . . Detection or reduction of fading in multipath transmission arrangements
- H03D 2200/0094 . . . Measures to address temperature induced variations of demodulation
- H03D 2200/0096 . . . by stabilising the temperature
- H03D 2200/0098 . . . by compensating temperature induced variations